BIOLOGY 6090
POPULATIONS: EVOLUTIONARY GENETICS
Winter, 2019

Instructor: Thomas Dowling
Email: thomas.dowling@wayne.edu

Lecture: TTH 1:00-2:15 PM **Place:** 0114 STAT
Office: BIO 3113
Office hours: TTH 9:30-11:00 AM or by appointment

Topic	Text
Introduction/Origins of population genetics	Provine
Tools for assessing variation	Chapter 1
Measures of variation	Chapter 2
Hardy-Weinberg equilibrium	Chapter 2
Linkage disequilibrium	Chapter 9
Selection	Chapter 3
Genetic drift	Chapter 4
Mutation	Chapter 5
Neutral theory and coalscence	Chapter 6
Inbreeding and other forms of nonrandom mating	Chapter 8
Population subdivision and migration	Chapter 7
Phylogeography	TBA
Speciation	TBA

Text: Hedrick, P. W. 2011. *Genetics of Populations, 4th edition.* Jones and Bartlett. **(required)**

Additional reading/resources:
Provine, William B. 1971. *The Origins of Theoretical Population Genetics*. Univ. Chicago Press. **(not required)**
Assorted papers (journal articles, book chapters, etc.) for use in the discussion section **(to be made available by the instructor on Blackboard -** blackboard.wayne.edu**)**
Access to a computer (preferably a PC)

Grades will be based on the following:
1) Two take home exams (30% each)
Exam 1 distributed 26 February, returned 5 March
Exam 2 distributed 18 April, returned 25 April
2) Homework assignments (20%)
3) Participation in discussion (20%)

**** The instructor reserves the right to make changes to the above schedule and topics****

COURSE DESCRIPTION:
This is a graduate level course in population genetics, specifically designed to give our graduate students background knowledge and analytical skills that will be useful as they complete their research projects and degrees. Material will be presented in the form of traditional lectures, group discussion of readings from the primary scientific literature, and use of various computer programs.

The course is both theoretical and applied, providing students a solid foundation in population genetics and use of this information for understanding evolution. Given this, students are expected to come into the course with certain knowledge and abilities:

1. Genetics – understanding basic genetic principles, specifically focused on understanding how genetic variation is generated and transmitted
2. Evolution – understanding basic evolutionary principles and how these effect the distribution of genetic variation within and among populations
3. Math – population genetics is firmly based in mathematics (e.g., algebra, calculus); therefore, it is important to have that skill
4. Use of computer programs – we will be using computer programs to analyze data; therefore, students will need to be familiar with how to use a computer beyond basic word processing and Powerpoint. Ability to use Excel is important.

COURSE OBJECTIVES:
- To develop an understanding of population genetic principles and how they apply to the fields of biodiversity, genetics, and ecology
- Learn to characterize population genetic processes with a variety of computer programs
- Synthesize concepts (objective 1) and practice (objective 2), allowing for analysis and interpretation of data in an evolutionary context

ADD/DROP POLICY:
Add forms will not be signed after the second week of class. **Drop** forms must be signed before the end of "study day", which is the day after the last day of classes (Note: It is not a good idea to wait until the last day to drop; instructors are often hard to find on "study day")**.** Please note that "**incomplete**" grades will not be issued to students in poor standing who are seeking an alternative to a late drop.

CHEATING POLICY:
A student found cheating during an exam (using a "cheat sheet" or electronic device, looking at another's paper, or allowing another to look at yours), or by turning in an assignment containing any plagiarism, will receive a zero for that test or assignment with no opportunity to drop or replace that score. A second episode of cheating will result in a grade of E for the course and possible university disciplinary action.

Students with disabilities: If you have a physical or mental impairment that may interfere with your ability to successfully complete the requirements for this course, you are invited to contact Educational Accessibility Services (583 Student Center Building; 577-1851) to discuss appropriate accommodations on a confidential basis.

Academic disputes, including issues not specifically resolved or covered by this syllabus, will be resolved by following the guidelines for University Student Due Process.